Commercial Site Assessment™ Tier II

Prepared for:

Somerset Townhomes Association

17793 Layton Path
Lakeville, MN 55044

2020 Season

Proud Partner of TORO®

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Conserva Irrigation's Methodology and Approach

1. **Perform Commercial Site Assessment (CSA™)**
    - **Tier I CSA™:** High Level Water Use Assessment
      - irrigated acreage data from water purveyor
      - Obtain water usage reports from the water purveyor
      - Determine overall application efficiency
      - Develop water usage goals
    - **Tier II CSA™:** "Boots on the Ground" System Assessment
      Tier I CSA, plus:
      - Full hydraulic and electronic asset assessment
      - Observe and record system functions
      - Perform risk assessment/exposure analysis
      - Document system repairs and improvements

2. **Prioritize Critical Repairs/Adjustments to Optimize the System Performance**

3. **Recommend Efficiency Upgrades**
    - Replace inefficient spray nozzles with highly efficient Toro Precision™ Series Nozzles or Hunter MP™ Rotary Nozzles
    - Recommend potential system additions and redesigns

4. **Optimize the System Performance**

5. **Annually Maintain and Monitor the Irrigation System**

Commercial Site Assessment™

Date of Tier I CSA: August 26st, 2020
Certified Technician: Garret Peterson, CLIA, CIT

Date of Tier II CSA: August 26th, 2020
Certified Technician: Garret Peterson, CLIA, CIT

Irrigated Acres: 6.01
Irrigated ft^2: 261,935.98 ft^2

Somerset Townhome Association - System Audit Observations

Somerset has 2 water sources and 6 controllers for 63 zones total.

- ***Controller #1*****:** Nelson EZ Pro, 11 zones, Irritrol Wireless Rain Sensor™ (Working)
    - *Program A*: Start 12:01am, Odd days, Station 1-11

- ***Controller #2*****:** Nelson EZ Pro, 11 zones, Hardwired Rain Sensor (Working)
    - *Program A*: Start 12:01am, Odd days, Station 1-11

- ***Controller #3*****:** Nelson EZ Pro, 11 zones, Hardwired Rain Sensor (Working)
    - *Program A*: Start 12:01am, Odd days, Station 1-11

- ***Controller #4*****:** Nelson EZ Pro, 12 zones, Hardwired Rain Sensor (Working)
    - *Program A*: Start 12:01am, Odd days, Station 1-12

- ***Controller #5*****:** Nelson EZ Pro, 12 zones, Hardwired Rain Sensor (Not Working)
    - *Program A*: Start 12:01am, Odd days, Station 1-12

- ***Controller #6*****:** Nelson EZ Pro, 6 zones, Hardwired Rain Sensor (Working)
    - *Program A*: Start 12:01am, Odd days, Station 1-6

Controllers are basic “set and forget” controllers. Recommend upgrading to smart controllers with Hotspot for weather data. Smart controllers manage water use based on weather data and plant need (Evapotranspiration), reducing overall use and saving water.

Some zones across the property do not account for Microclimate separation, irrigating both front lawns (dry hot microclimate) and backyards (wet cool microclimates) with the same amount of water. Irrigating differing microclimates on the same zone results in soaked backyards that can have standing water and promote disease as front yards require more water. However, without installing whole new zones or changing out all the heads with new heads, this issue is hard to resolve. A nozzle swap is not feasible due to four different brands and models (many older) making up the system.

Houses along Layton Path West have a sidewalk through front yards that are being watered over by rotors. Recommend making boulevards Hunter MP™ Rotary heads for proper coverage and adding rotors (as needed) on opposing house side of sidewalk to reduce water waste.

Across the systems there were common issues of leaking heads, heads that did not turn, crooked/low/high heads, heads in landscaping that should be moved to turf, and heads in woods that should be capped.

Controller 6, zone 6 did not turn on electrically from controller. We operated the zone manually to get zone data. It is suggested that the issue be investigated.

Water Rates:

Meter Reading Interval: ☐ Monthly ☒ Quarterly ☐ Other _____

Units Measured As: ☒ 1000 gallons ☐ CCF

Converted Units: ☒ 1 unit = 1000 gallons

WATER RATES	Irrigation Metered System
Price per unit (per 1,000 gals)	$5.64
Threshold per quarter	Irrigation Metered System
Sewer Rate per unit (if unmetered):	Does not apply

Historical Water Usage:

Water Source #1

Year	Annual Water Usage (gallons)	Annual Water Cost*
2019	279,000	$1,574.00
2018	652,000	$3,677.00
2017	774,000	$4,365.00
2016	412,000	$2,324.00
2015	617,000	$3,480.00
2014	369,000	$2,081.00
2013	2,212,000	$12,476.00
2012	2,048,000	$11,551.00
2011	963,000	$5,431.00
2010	948,000	$5,347.00
10 Year Average	927,400	$5,230.54

Water Source #2

Year	Annual Water Usage (gallons)	Annual Water Cost*
2019	118,000	$665.50
2018	632,000	$3,564.00
2017	750,000	$4,230.00
2016	350,000	$1,974.00
2015	394,000	$2,222.00
2014	477,000	$2,690.00
2013	978,000	$5,516.00
2012	1,092,000	$6,159.00
2011	597,000	$3,367.00
2010	438,000	$2,470.00
10 Year Average	582,600	$3,285.86

*Based on current Water Rates for best year to year comparison.

Water Source 1 & 2 Total Usage

Year	Annual Water Usage (gallons)	Annual Water Cost*
2019	397,000	$2,239.00
2018	1,284,000	$7,242.00
2017	1,524,000	$8,595.00
2016	762,000	$4,298.00
2015	1,011,000	$5,702.00
2014	846,000	$4,771.00
2013	3,190,000	$17,992.00
2012	3,140,000	$17,710.00
2011	1,560,000	$8,798.00
2010	1,386,000	$7,817.00
10 Year Average	1,510,000	$8,516.40

*Based on current Water Rates for best year to year comparison.

Note: 2019 was a wet year, simple controllers can be shut down or put on rain delay to reduce usage but smart controller take the leg/guess work out of the equation to avoid years like 2017 and 2018.

Plant Water Requirement (ET Data & Average Effective Rainfall):

Plant Material: **1,115,699 gallons** Spend: **$6,293/yr.**

$$Eff\ \% = \frac{water\ need}{water\ use} \qquad Eff\ \% = \frac{1{,}115{,}699}{1{,}510{,}000} = 74\%$$

Minimum EPA efficiency standard = 75%

Water Usage Goals:

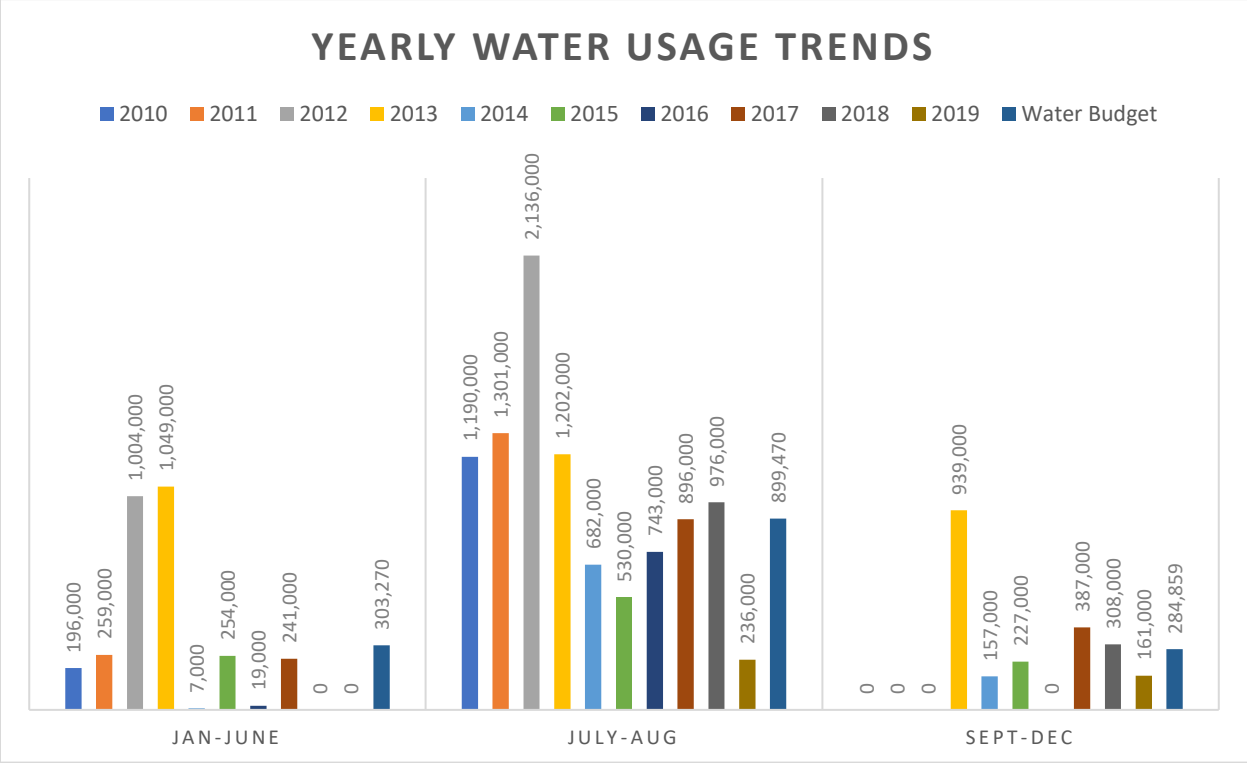
$Eff = 75\%$: 1,487,599 gallons used at an annual cost of **$9,236**

$Eff = 85\%$: 1,312,587 gallons used at an annual cost of **$8,249**

$Eff = 95\%$: 1,174,420 gallons used at an annual cost of **$7,470**

Water Budgeting (total water use on site):

Month	Jan-June	July-Sept	Sept-Dec	**Total(gal)**
2010 Usage	196,000	1,190,000	0	**1,386,000**
2011 Usage	259,000	1,301,000	0	**1,560,000**
2012 Usage	1,004,000	2,136,000	0	**3,140,000**
2013 Usage	1,049,000	1,202,000	939,000	**3,190,000**
2014 Usage	7,000	682,000	157,000	**846,000**
2015 Usage	254,000	530,000	227,000	**1,011,000**
2016 Usage	19,000	743,000	0	**762,000**
2017 Usage	241,000	896,000	387,000	**1,524,000**
2018 Usage	0	976,000	308,000	**1,284,000**
2019 Usage	0	236,000	161,000	**397,000**
Avg Usage	**302,900**	**989,200**	**217,900**	**1,510,000**
Water Budget	**303,270**	**899,470**	**284,859**	**(75%eff)1,487,599**



System Components:

Water Source				Deficiency?
#1	Location	17791 Layton Path, Lakeville, MN 55044		
	Source	2” City Feed		
	Anti-syphon			
		Brand	Watts	
		Size	2”	
		Inspection Date	6-18-2020	
		Visual Inspection	No apparent leaks, may not be 1’ above highest head.	
	Deduct Meter			
		Brand	Sensus	
		Size	1 ½”	
		Serial Number	65107591	
		Reading	15,645,376 Gallons	
		Visual Inspection	Good	
	Master Valve			
		Brand	N/A	
		Size	N/A	
		Volt/AMP	N/A	
		Visual Inspection	N/A	
	Notes:			

Water Source				Deficiency?
#2	Location	17701 Lankmark Ct, Lakeville, MN 55044		
	Source	2” City Feed		
	Anti-syphon			
		Brand	Wilkins Zurn	
		Size	1 ½”	
		Inspection Date	Test Papers Water Damaged, unreadable	
		Visual Inspection	Good, no leaks	
	Deduct Meter			
		Brand	Invensys	
		Size	1 ½”	
		Serial Number	62855807	
		Reading	12,403,399 Gallons	
		Visual Inspection	Good	
	Master Valve			
		Brand	N/A	
		Size	N/A	
		Volt/AMP	N/A	
		Visual Inspection	N/A	
	Notes:			

Recommend Critical Repairs and Adjustments Source #1 Controller #1

	Zones											
Head Type	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***Total***
Total # Rotors	21	21	20	13	25	-	27	21	19	17	17	**201**
Total # Sprays			2									**2**
Rotating Nozzles												
Mini Rotors												
High Pop Rotors												
6" Sprays												
12" High Pop Sprays												
Mixed Head Types			X									
Zone GPM	31	33	29	25	40	0	31	25	33	25	27	**-**
Repairs	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***Total***
Damaged Rotors	3	3	9	4	4		5	4	2	4	3	**41**
Damaged 4" Sprays												
Damaged 6" Sprays												
Damaged High Pop Rotor												
Damaged High Pop Spray												
Line Leaks												
Wrong Nozzles Sizing		1										**1**
Damaged Nozzles												
Raise/Straighten Heads	1	3		2	4				1	1		**12**
Design Improvements	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***Total***
Move a head		1			1			1				**3**
Add a head												
Cap a head		1			1							**2**

Recommend Critical Repairs and Adjustments Source #1 Controller #2

	Zones											
Head Type	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***Total***
Total # Rotors	5	8	8	5	5	8	9	5	5	7	7	**72**
Total # Sprays				1		1					2	**4**
Rotating Nozzles												
Mini Rotors												
High Pop Rotors												
6" Sprays												
12" High Pop Sprays												
Mixed Head Types				X		X					X	
Zone GPM	31	33	29	25	40	0	31	25	33	25	27	-
Repairs	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***Total***
Damaged Rotors	2		3	1	3	2	4	2	2	2	3	**24**
Damaged 4" Sprays												
Damaged 6" Sprays												
Damaged High Pop Rotor												
Damaged High Pop Spray												
Line Leaks												
Wrong Nozzles Sizing												
Damaged Nozzles												
Raise/Straighten Heads		1					1			2		**4**
Design Improvements	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***Total***
Move Head			1								1	**2**
Add Head												
Cap a Head							1					

Recommend Critical Repairs and Adjustments Source #2 Controller #3

	Zones											
Head Type	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***Total***
Total # Rotors	7	5	6	6	5	5	6	7	3*	9	9	**68***
Total # Sprays					1							**1**
Rotating Nozzles					1							**1**
Mini Rotors												
High Pop Rotors												
6" Sprays												
12" High Pop Sprays												
Mixed Head Types					X							
Zone GPM	9	8.5	9	8	8	14	9	11	8*	12	11	**-**
Repairs	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***Total***
Damaged Rotors	2	3	2	1	1	2	2				1	**14**
Damaged 4" Sprays												
Damaged 6" Sprays												
Damaged High Pop Rotor												
Damaged High Pop Spray												
Line Leaks									1			**1**
Wrong Nozzles Sizing												
Damaged Nozzles												
Raise/Straighten Heads			1					1				**2**
Design Improvements	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***Total***
Move Head			1	2		2	1	1				**7**
Add Head		2			1							**3**
Cap a Head								1		2		**3**
Zone Notes		Large gap in coverage	2 rotors should be MP due to small coverage area						*Root Pinch causing not all heads to pop		Mini rotor by drive not covering area well.	

Recommend Critical Repairs and Adjustments Source #2 Controller #4

	Zones												
Head Type	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***	***Total***
Total # Rotors	9	9	6	7	7	5	8	5	8	6	4	6	**80**
Total # Sprays							1						**1**
Rotating Nozzles													
Mini Rotors													
High Pop Rotors													
6" Sprays													
12" High Pop Sprays													
Mixed Head Types							X						
Zone GPM	13	10	9	13	10	8	13	7	11	10	6.5	8	-
Repairs	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***	***Total***
Damaged Rotors	4	2	2	1	4	1	1		1	3		4	**23**
Damaged 4" Sprays													
Damaged 6" Sprays													
Damaged High Pop Rotor													
Damaged High Pop Spray													
Line Leaks													
Wrong Nozzles Sizing													
Damaged Nozzles													
Raise/Straighten Heads		4	2						2				**8**
Design Improvements	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***	***Total***
Move Head							1						**1**
Add Head													
Cap a Head								1					1
Zone Notes											No Issues		

Recommend Critical Repairs and Adjustments Source #2 Controller #5

	Zones												
Head Type	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***	***Total***
Total # Rotors	4	5	8	6	6	5	7	8	11	6	8	6	80
Total # Sprays													
Rotating Nozzles													
Mini Rotors													
High Pop Rotors													
6" Sprays													
12" High Pop Sprays													
Mixed Head Types													
Zone GPM	7	7	10	8	8.5	8	9	11	11	13	13	9	-
Repairs	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***	***Total***
Damaged Rotors			3			1	3	1	1	1	1	1	**12**
Damaged 4" Sprays													
Damaged 6" Sprays													
Damaged High Pop Rotor													
Damaged High Pop Spray													
Line Leaks													
Wrong Nozzles Sizing			1										1
Damaged Nozzles													
Raise/Straighten Heads						2	1			1		1	**5**
Design Improvements	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***	***Total***
Move Head		2				1	2	1	1	2			**10**
Add Head	1			1	2		1	1	1	1	1		**9**
Cap a Head													
Zone Notes												All Full Circle	Rain sensor doesn't work

Recommend Critical Repairs and Adjustments Source #2 Controller #6

	Zones						
Head Type	***1***	***2***	***3***	***4***	***5***	***6***	***Total***
Total # Rotors	9	6	11	8	7	8	**49**
Total # Sprays		3					**3**
Rotating Nozzles							
Mini Rotors							
High Pop Rotors							
6" Sprays							
12" High Pop Sprays							
Mixed Head Types		X					
Zone GPM	**15**	**12**	**14**	**11**	**9**	**10**	**-**
Repairs	***1***	***2***	***3***	***4***	***5***	***6***	***Total***
Damaged Rotors	2		2	1			**5**
Damaged 4" Sprays							
Damaged 6" Sprays							
Damaged High Pop Rotor							
Damaged High Pop Spray							
Line Leaks							
Wrong Nozzles Sizing					1	1	**2**
Damaged Nozzles							
Raise/Straighten Heads							
Design Improvements	***1***	***2***	***3***	***4***	***5***	***6***	***Total***
Move Head							
Add Head						1	**1**
Cap a Head							
Zone Notes						Will need to troubleshoot electrical, did not fire from controller.	

Completed Critical Repairs and Adjustments

Repairs	Price (each)	Count		Total
1R.) Installed 5" Rotor	$ 50.00	119		$ 5,950.00
2R.) Move Head (per foot)	$ 15.00	22 heads total of 104'		$ 1,560.00
3R.) Poly line root pinch/obstruction	$ 120.00	1		$ 120.00
4R.) Cap unneeded head	$ 30.00	7		$ 210.00
5R.) Electrical troubleshooting of zone 6 on controller #6. (estimate T & M)	$ 100.00	1		$ 100.00
				$ 8,320.00

Recommended Efficiency Upgrades

System Efficiency and Design Upgrades	Price (each)	Count		Total
1U.) Controllers #1-5: Hunter PHC (12 zones) w/Hot Spot for Internet Weather Station Data	$ 1,000.00 + $ 15 a month	5		$ 5,000.00 + $ 75 a month
2U.) Controller #6: Hunter PHC (7 zones) w/Hot Spot for Internet Weather Station Data	$ 625.00 + $ 15 a month	1		$ 625.00 + $ 15 a month
3U.) Replace nonfunctional Rain Sensor (controller 5)	$ 150.00	1		$ 150.00
4U.) Hunter MP Rotary Nozzles for Spray Heads	$ 25.00	10		$ 250.00
5U.) Rotor Nozzle Swap for Rotor Heads to match coverage areas	$ 15.00	4		$ 60.00
6U.) Add Head	$ 100.00	13		$ 1,300.00
7U.) Raise / Straighten Heads	$ 15.00	31		$ 465.00
8U.) Rotor head swap for microclimate differences (does not count heads needing repairs)	$ 50.00	388		$ 19,400.00
				$ 27,250.00

In summary, completing the recommended critical repairs and upgrades will result in substantially more efficient water usage and healthier plant material.

Next Steps:

- ☐ Fix repair issues
- ☐ Move heads to a better position
- ☐ Upgrade controller to a Smart Controller based on weather
- ☐ Raise/straighten heads as needed to have proper coverage
- ☐ Cap unneeded heads
- ☐ Add heads in areas that are lacking proper coverage
- ☐ Replace rotor nozzles (gpm application rate) that are incorrect for the area of coverage the head is to cover with the correct size nozzle
- ☐ Electrical troubleshooting of zone 6 on controller #6
- ☐ Replace nonfunctional rain sensor
- ☐ Annually maintain and monitor property